

What is Claimed is:

- 1           1.       A firearm laser training system enabling a user to project a laser beam toward  
2 a target to simulate firearm operation comprising:  
3           a target including a plurality of zones, each zone representing an intended target site;  
4           a sensing device to scan said target to produce scanned images of said target including  
5 impact locations of said laser beam on said target; and  
6           a processor to receive from said sensing device information associated with said  
7 impact locations detected by said sensing device, wherein said processor includes an  
8 evaluation module to process said received information to evaluate user performance and to  
9 display information relating to said evaluation and an image of said target with indicia  
10 indicating said detected impact locations on said target.
- 1           2.       The system of claim 1, wherein said impact location information includes  
2 coordinates of detected impact locations within said scanned target images.
- 1           3.       The system of claim 1, wherein said impact location information includes said  
2 scanned target images, and said evaluation module includes a coordinate module to determine  
3 coordinates of detected impact locations within said scanned target images.
- 1           4.       The system of claim 3, wherein said coordinate module includes a detection  
2 module to identify said detected impact locations within said scanned target images based on  
3 scanned image pixel values exceeding a threshold.
- 1           5.       The system of claim 4, wherein said evaluation module further includes a  
2 threshold module to automatically adjust said threshold in response to measured light  
3 conditions of a surrounding environment.
- 1           6.       The system of claim 1, wherein said processor further includes a calibration  
2 module to correlate a target space associated with said target with a target space associated  
3 with said scanned target images.

1           7.       The system of claim 6, wherein said calibration module includes an overlay  
2 module to display an overlay on an image of said target to facilitate alignment of said target  
3 spaces of said target and said scanned target images.

1           8.       The system of claim 7, wherein said calibration module further includes an  
2 alignment module to automatically align said overlay with said target image in accordance  
3 with target boundary locations indicated by said user on said target image.

1           9.       The system of claim 1, wherein said sensing device includes a calibration  
2 module to correlate a target space associated with said target with a target space associated  
3 with said scanned target images.

1           10.      The system of claim 1, wherein each said zone is associated with performance  
2 information and said evaluation module includes a performance module to evaluate user  
3 performance based on said performance information of zones impacted by said laser beam.

1           11.      The system of claim 10, wherein said performance module includes a scoring  
2 module to access a target file associated with said target including score values associated  
3 with each of said zones and to determine an aggregate score for a user by accumulating score  
4 values of zones impacted by said laser beam.

1           12.      The system of claim 10, wherein said processor stores a plurality of target files  
2 associated with a plurality of targets that are accessible to said performance module.

1           13.      The system of claim 1, wherein said sensing device includes a camera.

1           14.      The system of claim 1 further including a case to secure and transport at least  
2 said target and said sensing device.

1           15.      The system of claim 14, wherein said case includes an upper member pivotally  
2 attached to a lower member, said upper member including a target retaining section to secure  
3 said target during system operation.

1           16.     In a firearm simulation system enabling a user to project a laser beam toward  
2 a target and including a sensing device and a processor, wherein said target includes a  
3 plurality of zones, each zone representing an intended target site, a method of simulating  
4 firearm operation comprising the steps of:

5           (a)     projecting a laser beam toward said target to produce impact locations on said  
6 target;

7           (b)     scanning said target with said sensing device to produce scanned images of  
8 said target including impact locations of said laser beam on said target;

9           (c)     transmitting from said sensing device to said processor information associated  
10 with said impact locations detected by said sensing device; and

11          (d)     processing said transmitted impact location information to evaluate user  
12 performance and to display information relating to said evaluation and an image of said target  
13 with indicia indicating said detected impact locations on said target.

1           17.     The method of claim 16, wherein step (b) includes:

2           (b.1)   determining coordinates of said detected impact locations within said scanned  
3 target images;

4           and step (c) includes:

5           (c.1)   transmitting said coordinates from said sensing device to said processor.

1           18.     The method of claim 16, wherein step (c) includes:

2           (c.1)   transmitting said scanned target images to said processor; and

3           step (d) includes:

4           (d.1)   processing said scanned target images with said processor to determine  
5 coordinates of said detected impact locations within said scanned target images.

1           19.     The method of claim 18, wherein step (d.1) includes:

2           (d.1.1) identifying said detected impact locations within said scanned target  
3 images based on scanned image pixel values exceeding a threshold.

1           20.     The method of claim 16, wherein step (b) includes:

2 (b.1) correlating a target space associated with said target with a target space  
3 associated with said scanned target image.

1 21. The method of claim 20, wherein step (b.1) includes:

2 (b.1.1) displaying an overlay on an image of said target to facilitate alignment of  
3 said target spaces of said target and said scanned target images.

1 22. The method of claim 21, wherein step (b.1.1) includes:

2 (b.1.1.1) automatically aligning said overlay with said target image in  
3 accordance with target boundary locations indicated by said user on said target image.

1 23. The method of claim 16, wherein each zone is associated with performance  
2 information, and step (d) includes:

3 (d.1) evaluating user performance based on said performance information of zones  
4 impacted by said laser beam.

1 24. The method of claim 23, wherein step (d.1) includes:

2 (d.1.1) accessing a target file associated with said target, wherein said target file  
3 includes score values associated with each of said zones; and

4 (d.1.2) determining an aggregate score for a user by accumulating score values of  
5 zones impacted by said laser beam.

1 25. A firearm laser training system enabling a user to project a laser beam toward  
2 a target to simulate firearm operation comprising:

3 target means for receiving said projected laser beam, said target means including a  
4 plurality of zones;

5 sensing means for scanning said target means to produce images of said target means  
6 including impact locations of said laser beam on said target means; and

7 processing means for receiving from said sensing means information associated with  
8 said impact locations detected by said sensing means, wherein said processing means includes  
9 evaluating means for processing said received information to evaluate user performance and

10 for displaying information relating to said evaluation and an image of said target means with  
11 indicia indicating said detected impact locations on said target means.

1 26. The system of claim 25, wherein said impact location information includes  
2 coordinates of detected impact locations within said scanned images of said target means.

1 27. The system of claim 25, wherein said impact location information includes  
2 said scanned images of said target means, and said evaluating means includes coordinate  
3 means for determining coordinates of detected impact locations within said scanned images  
4 of said target means.

1 28. The system of claim 27, wherein said coordinate means includes detection  
2 means for identifying said detected impact locations within said scanned images of said target  
3 means based on scanned image pixel values exceeding a threshold.

1 29. The system of claim 28, wherein said evaluating means further includes  
2 threshold means for automatically adjusting said threshold in response to measured light  
3 conditions of a surrounding environment.

1 30. The system of claim 25, wherein said processing means further includes  
2 calibration means for correlating a target space associated with said target means with a target  
3 space associated with said scanned images of said target means.

1 31. The system of claim 25, wherein said sensing means includes calibration  
2 means to correlate a target space associated with said target means with a target space  
3 associated with said scanned images of said target means.

1 32. The system of claim 25, wherein each zone is associated with performance  
2 information and said evaluating means includes performance means for evaluating user  
3 performance based on said performance information of zones impacted by said laser beam.

1           33.     The system of claim 32, wherein said performance means includes scoring  
2 means for accessing a file associated with said target means including score values associated  
3 with each of said zones and for determining an aggregate score for a user by accumulating  
4 score values of zones impacted by said laser beam.

1           34.     The system of claim 25 further including storage means for securing and  
2 transporting at least said target means and said sensing means.

1           35.     The system of claim 34, wherein said storage means includes support means  
2 for securing said target means during system operation.